CLAIMS LISTING:

1. -72. (cancelled).

73. (currently amended) A fiber optic network for carrying optical signals, comprising:

at least one optical fiber for carrying an optical signal comprising return-to-zero phase-shift-keyed (PSK) optical pulses;

at least one laser to generate a cw optical signal;

at least one pulse modulator to transform cw optical signal into a pulsed return-to-zero (RZ) optical signal; the pulse modulator having a bias and the drive voltage to form optical pulses selected to achieve maximal spectral efficiency of PSK transmission, the bias and the drive voltage of the pulse modulator selected to form optical pulses that mitigate non-linearities of the fiber transmission line and minimize adjacent channel crosstalk, the bias and the drive voltage of the pulse modulator are selected according to the characteristics of laser optical power, network channel spacing, the fiber transmission line length, the fiber transmission line dispersion, and non-linearities of the fiber transmission network that minimizes the bit-error-rate of the transmitted signal, the pulse modulator configured to use electro-optics to generate optical pulses using amplitude modulation of a cw optical signal;

at least one PSK modulator connected to the pulse modulator to encode the data producing RZ-PSK signal for transmission in the fiber optic network;

a WDM combiner connected to the PSK modulator to combine <u>the</u> multiple <u>RZ-PSK</u> optical signals corresponding to multiple channels with arbitrary polarization states including at least one of linear, circular, or elliptical.

74. (previously presented) The fiber optic network of claim 73, wherein the optical signal further comprises a plurality of non-return-to-zero PSK optical pulses formed by the pulse modulator

wherein said optical pulses have bell-like shapes;

wherein said non-return-to-zero optical pulses have arbitrary polarization states including at least one of linear, circular, or elliptical.

75. (previously presented) The network of claim 73, wherein the optical fiber has a zero dispersion wavelength of less than about 1500 nanometers.

76. (previously presented) The network of claim 75, wherein the optical signal has a wavelength of between about 1500 nanometers and about 1625 nanometers.

77. (previously presented) The network of claim 73, wherein a dispersion of the optical fiber is at least about +2 picoseconds per nanometer per kilometer at or near a wavelength of the optical signal.

78. (previously presented) The network of claim 73, wherein a dispersion of the optical fiber is less than about -2 picoseconds per nanometer per kilometer at or near a wavelength of the optical signal.

79. (previously presented) The network of claim 73, wherein the optical fiber is a non-zero-dispersion shifted fiber.

80. (previously presented) The network of claim 73, wherein a dispersion of the optical fiber is at least about +15 picoseconds per nanometer per kilometer at or near a wavelength of the optical signal.

81. (previously presented) The network of claim 73, wherein a dispersion of the optical fiber is less than about -15 picoseconds per nanometer per kilometer at or near a wavelength of the optical signal.

82. (previously presented) The network of claim 73, wherein the optical fiber is single mode dispersion fiber having a zero dispersion wavelength of about 1310 nanometers.

83. (previously presented) The network of claim 74, wherein an extinction ratio

between adjacent pulses in said non-return-to-zero optical signal that have a relative phase difference of essentially zero is at least about 3 dB and less than about 8 dB.

84. (cancelled)

85. (currently amended) A method for optically transmitting data, comprising:

preparing a plurality of phase-shift-keyed (PSK) optical data streams produced by a plurality of PSK modulators, each PSK optical data stream having a different wavelength and encoding data from at least one respective data source;

combining the PSK optical data streams to prepare a wavelength division multiplexed (WDM) optical signal corresponding to multiple channels with arbitrary polarization state selected from at least one of, linear, circular, or elliptical;

modulating an amplitude of the WDM optical signal to prepare a return-to-zero phase shift keyed wavelength division multiplex (RZ-PSKWDM) optical signal comprising a plurality of return-to-zero optical pulses produced by pulse modulator with arbitrary polarization states selected from at least one of, linear, circular, or elliptical; said return-to-zero optical pulse shape selected to achieve maximal spectral efficiency; mitigate transmission line non-linearities and adjacent channel crosstalk; the optical pulse shape selected according to the characteristics of laser optical power, network channel spacing, the transmission line length, the transmission line dispersion, and non-linearities of the transmission network that minimizes the bit-error-rate of the transmitted WDM signals[.];

transmitting the RZ-PSKWDM optical signal along an optical fiber of an optical fiber network.

86. (previously presented) The method of claim 85, wherein the PSKWDM optical signal further comprises

a plurality of non-return-to-zero optical pulses having bell-like shapes;

said non-return-to-zero optical pulses having arbitrary polarization states selected from at least one of, linear, circular, or elliptical.

87. (previously presented) The method of claim 85, wherein each PSK optical data stream is a binary phase-shift-keyed BPSK optical data stream encoding data using a push-pull Mach-Zehnder modulator driven from a single respective data source.

88. (previously presented) The method of claim 85, wherein each PSK optical data stream is a quaternary phase-shift-keyed QPSK optical data stream encoding data using a quadrature modulator comprising of two push-pull Mach-Zehnder modulators driven from a respective pair of data sources.

89. (previously presented) The method of claim 85, wherein modulating an amplitude is performed after combining the PSK optical data streams of the WDM channels.

90. (previously presented) The method of claim 85, wherein preparing a plurality of PSK optical data streams of the WDM channels comprises modulating a phase of light provided by a cw light source.

91. (previously presented) The method of claim 85, wherein an extinction ratio between adjacent pulses in said non-return-to-zero optical pulse streams within the WDM transmission link has a relative phase difference of essentially zero is at least about 3 dB and less than about 8 dB.

92. (previously presented) The method of claim 91, wherein an extinction ratio between adjacent pulses in said non-return-to-zero optical pulse streams within the WDM transmission link has a relative phase difference of at least about $\pi/2$ is at least about 10 dB.

93. (previously presented) The method of claim 92, wherein an extinction ratio between adjacent pulses in said non-return-to-zero optical pulse streams within the WDM transmission link has a relative phase difference of essentially zero is at least about 5 dB and less than about 8 dB.

94. (previously presented) The method of claim 93, wherein an extinction ratio between adjacent pulses in said non-return-to-zero optical pulse streams within the WDM transmission link has a relative phase difference of at least about $\pi/2$ is at least about 20 dB.

95. – 104. (cancelled).

105. (previously presented) The network of claim 73, wherein the data modulator is a push-pull Mach-Zehnder modulator driven from a single respective data source.

106. (previously presented) The network of claim 73, wherein the data modulator is a quadrature modulator with first and second push-pull Mach-Zehnder modulators driven from a respective pair of data sources.